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Interfacial and confinement effects to the structure of nylon 6 /clay nanocomposites made by chaotic flow. DILRU RATNAWEERA, DVORA PERAHIA, CHAITRA MAHESHA, DAVID ZUMBRUNNEN , Clemson University, MARK KAMPF, Appelton — The structure of polymers within nanocomposites is strongly affected by the confinement of the polymer to the interface with the nanoparticles and the method of blending. In nanocomposites of Nylon 6 and clay particles are made by chaotic blending, the strength of the chaotic flow affects the internal structure on multiple length scales, where the local structure is determined by the interfacial effects between the polymer and the nano-particle. The structural evolution as a results in alternating layers of nylon and nylon/clay regions forming two distinct interfaces, that with the clay and that of the pure nylon and the composite. The structure has been studied by X-ray, AFM and TEM at different chaotic blending strengths. At the interface with the clay particles, the polymer chains orient perpendicular to the interface. While the alpha crystalline form dominated the structure of the polymer in melts, the confinement to the layers results in an enhanced gamma form where hydrogen bonds form in between parallel nylon 6 chains dominate.

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